Menlo Park Notebook #112 [N-80-07-23]

This notebook covers the period July-August 1880. Most of the entries are by Francis Upton. There are also a few entries by Edison. The material relates mainly to tests of carbon lamps. Included are a few notes and a table relating to faults that were found in the lamps, based on the experiments recorded in Notebook #103; notes and occasional drawings relating to tests of six-inch bamboo carbon lamps, along with a table of results; and a record of bets among the laboratory staff on the life of the lamps being tested. There are also notes relating to the burning of kerosene lamps in order to determine their cost; and notes on conductors, dynamos, meters, lamps, and wiring for the Menlo Park distribution system. The label on the front cover is marked "Upton" and "Lamps." The book contains 284 numbered pages.

Blank pages not filmed: 4-5.

6" Bamboo Table p 163

Page 69-75

87 - 123 - 125 - 131

133 - 137 - 145 - 149

Kerosene oil test p 213

Kerosene at 22 cts per gallon cost 80 cts per M

LIBRARY OF THE

BOARD OF PATENT CONTROL,

120 BROADWAY, NEW YORK.

From Library
GENERAL ELECTRIC.
44 Broad St. N.Y.

May 1, 1896

WILLIAMS & PUSEY,
Publishers, Stationers
and
Blank Book Manufacturers.
77 Broad St. Newburgh, N.Y.

1300 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 1 2 3 4 5 6 7 8 9 30 1 2 3 4 5 6 7 8 9 40 1 2 3 4

1345 6 7 8 9 50 1 2 3 4 5 6 7 8 9 60 1 2 3 4 5 6 7 8 9

TAE

1 2 7
2 2 2 5
3 2 3 3
4 2 4 1

1380 1 2 3 4 5 6 7 8 9 1390 1 2 3 4 5 6 7 8 9 99 1400

Questions

Does a lamp appear to give more light in the evening than in the day time?

Does a lamp change its resistance after it has been brought up once very high?

The relation between the the temperature of the lamps and their permanence

Try a number of lamps very high on pumps

THE

Last 2

Bast Paper Bamboo 131 minutes

Bast	Paper	Bamboo
Total Minutes		Total Minutes
9	3 minutes	11½
14		9
2		1 minor + Mentok Lamp
2		22
13		52
7		2
1		1
12		5
5		1
2		2
		26

TAE

11 131

At	Candles	Ohms	Ohms
	15.5	146.9	108.3
	16	142.14	122.9
	15.5	127.6	112.9
	16	109.6	97.1
	17.5	125.1	111.4
	16	140.9	120
	15.5	129	111.4
	16	118.11	104.9
	17.5	99.1	91.2
	16	160.4	89.4
			145.4

Results from Book 10 3

	Range	ft. lbs	Lasted
Bamboo	255	3900	26 minutes
Bamboo	231	4150	5
Bamboo	225	4300	12
Bamboo	217	4350	5 2½
Bast	199	4640	7
Bast	239	4670	5
Bast	235	4900	12
Bamboo	209	4950	60
Bamboo	213	5010	22
Bast	195	5080	13
Bamboo	139	4030	9

Results over

TAE

TAE

A low resistance lamp with high economy lasts well.

A low resistance lamp with low economy shows fault in cutting.

The life of a lamp depends entirely on the weakest spot, and the lamp always breaks at the ~~one~~ spot ~~is~~ which shows at low red the brightest.

The blue in a lamp depends on the highest

Temperature of any part of the carbon and an internal area

THE

Lamp 1307 July 22. 1880

coarse ~~bad~~ bamboo

Good carbon

16 candles

6290
6290
6250
1506

20330
1616

Traces of blue

11-10 48 candles

6290
6290
6200

18780
939

11-32 blue disappeared

12- Engine stopped page 19

TAE

16

17

Estimate 6 inch lamps

July 23rd 1880

10 candles 2700 ft lbs

15 candles 1350

4050

Practically 8 per H.P.

TAE

Lamps 1307 from Lage re-
coarse bamboo

burned 50 minutes

1-57 Started
48 candles

2,15 Blessed 68 Devotees

THF

Lamp 1316
dreamwold

very hard after J
did not go to
48 candles

TAE

Lamp 1304
Bamboo

Very good carbon

2-42 Started Reversed current

4-16 Went very rapidly

1.8
16
60
94 minutes

TAE

Globe darkened

M. 1308 Bamboo
Made from coarse flour

Resistance Cold

6290
6250
6250
6290
6290
2100

YAE

Very even except towards end clumps dark

8 candles

6250
6290
6290
2100
20930
104.6 Ohm
230
76.6

No. 1308
Coarse Bamboo

16 candles

250 = N

6250
6290
6290
2000
20830
10415

THE

No. 1308

5-12	Reversed the current to Camp very fast
5-37	Stopped T Hall for motor
1-25	
A.M.	
9-30	Started 48 candles
954	24 25 49 minutes

No 1310

Jap bombers

Very poor carbon

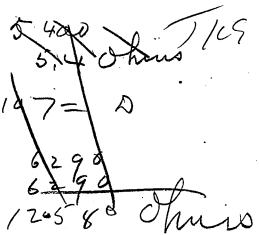
TAE

Lamp 1304 mid mid period
Benutec TAE

1-3 5'	Good carbon Started Bear fuse of magnet so as to do away with blue
2-35	broke

No 1239 V 113

Wound with wire



The blue could not be made to disappear. Tried magnet on carbon could by placing the globe in a certain position cause the blue to disappear entirely

1.5515
1.5515
1.6464
5.7031
3.6525 4500
4.5185

3
.8660 7.5 per H.P.

dump #1323 July 24, 1900
Heated to white
in Kerosene

16 candles
107 = D
35.6
12.58 Ohms

67.5 inches
125 = D
4
5.41 6296
3000
10.096 Ohms

5-55 Took off current

4,0157
2.1945
1.8242

66. ft/lb

4416 1.6493
1.6493
1.6424
9.0737
4.0187

10.400

65.745 1.8145
14.75 1.1686.
.6457

19 1.2914
0.9031
156 candles 2.1945

No 1323

50
26 3/4
53 1/4 148.

Kerosene oil lamp
8 candles

9-37 65. 3/4 inch

134
4416

6290
2150
8440.

7 49/392 δ. candles per H.P.

1.7267
1.7267
1.6464
9.1477
4.2425

17.500 ft. lbs

4.2425 − 2.5441 = 1.6984

30 ft. lbs per candle

No 1323 Thos A Edison
Feb 26 1880

9-48 Could not measure very easily but estimated at 350 candles

7.2 Ohms

160/53.3 Volts.

10-1 Went at top of carbon 13 minutes

Beast No. 1324

Incan descent for a short time in oil

Book 137 p 53

Resistance cold 135.4 Ohms

16 candles

86.9 Ohms

71.6 Volts

2620 ft. lbs.

12.5 per H.P.

No 1324 July 26. 1880

3.2 48 candles

6290
6290
3720
16300
81.5 Ohms

93.3 Volts

3760 ft lbs.

3.75 per H.P.

3.37 ~~Heat~~ Chas
2 to 4 hrs maximum

35 minutes

No 1324

4-53
5-01

Started

THE

2.0481
2.0481
1.6464
7.6747
3.4173
4.5155
1.1012

2600

12.6 per H.P.

No. 13 2.5 millac fitter July 26 1880

16 candles

335 = 10
1116

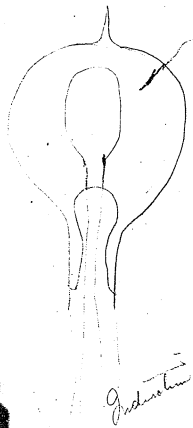
6290
6290
6250
6250
6290
6290
4760

42360

218.6

Thomas A. Edison

Water at dam



Lamps

fixed with induction coils.

16 candles

6290
6250
6250
6290
6290
45100.

35870

179.35

TAE

The vacuum gauge

273
272
54.5
at 128.5
20
1.08

91.6 Volts

4430

1.08

2.7364
7.8911
1.3010
0.0334
1.9619
1.9619
1.6464
8.0726
3.6464
.6018
.0346

Aug 27. 60

Calor & Galvo

2-15 Temp air 83° 3 4

2-48-3 70.97

94
70.9
231

273

12580
4200
16780
83.9 ohms

272
20 cells

64.5
64
1285

2-55 89° 7
2-57 94° 4

4142
9494
48

1132
.5 elev

1137
2445

8905
20
910

TAE

7.9599
0.3432
2.8893
9.0458
1.3636

23.1

3.6018
48
5970

4000

497 2.6964
Lamp 129.5 7.8877
Loss 20 1.3016
1.06 0.0253
9.2140
1.9104
8 | volts 1.9104
1.1646
120.15 7.9205
3.3877
2440 ft. lbs.
4.5-185
1.1308
13.5 per ft. ®

Lamp No. 1327
New mould Aug 27. 80

16 candles

247
250
497
1864.30
5-3000 TAF
2361.30
120.15 Ohms

66
63.5
1295
20 cells

2.7627
9.2140
1.9767
1.9767
1.6464
7.9568
3.5566

3600

3.6000
4.5151
.9619
9.1 H.P

Lamp No 1327

3-44

48 candles

291
288
579

18830
3300
22130
110.6 ohms

TAE

4.51
3.44
1.07

Counted at 4.51

2.7752
9.2140
1.9892 — 97.5 Volts.
1.9892
1.6464
7.8962
3.5210 — 3300

Lamp No 1328 Feb. 28 — 61

New Mould

16 candles

25080
350
25430
127.15

296
300
596 Lamps.

66.25
63.5 — 20 cells
12975

Cracked in the glass around the clamps.

2.6866
9.2140
1.9600 79.5
1.9000
1.6464
8.0083
3.4547 2850
4.5.15.5
1.0638

11.5 per H.P.

Lamp No 1322
Reed Bamboo

16 candles

245
241
486

6250
6290
6290
800

19630
98.1 Ohms

TAE

2.7419
9.2140
1.0559
1.9557
1.0764
9.9017
3.4599 2882
3.5185
.0586

11.5 per H.P.

Lamp No. 1328
Good vacuum

16 candles

27.2

250 80
125.4 T.E.

280
272
8.52

675
61.5
1290

2.8075
9.4140
2.0215
2.0215
1.6054
7.9459
3.3353
log 2 0.3010
3.6363 4330
4.5155
.8822

7.6 per H.P.

Engine.

1-43 48 candles

18530
3776
22600
113

TAF

218
324
642

1.57½ Went out.

150 = 1761
2 · 1761
1 · 5064
7 · 7258
37244
330 = Wrong

Jh 1937 July 29.
6 inch length
16 candles
43 R
44 L
87

305
302
607

37,660
188 Ohms

68 5 | 1.8357
11 5 | 1.0607
5 9 | 1.7750
2
1.5500

35.5
2
71

66 candles

$\frac{80^2}{(80-x)^2} = \frac{66}{48}$

$\left(\frac{80}{80-x}\right)^2 = \frac{24}{72}$

$80^2 = 66(80-x)^2$

TAE

12 | 70 | 49
10 | 2
98

68 | 1.8325
12 | 1.0792
7533
66 | 2
1.5066

39.5
2
79

69 | 1.8384
11 | 1.0414
7984
2
1.5986

534 2.7275
8.1870
1.06 0.0334
20 1.3010
2.2490
177 2.2490
1.6467
7.9696
3.9140

8200 Wrong

No 1337
6" long Bamboo
at 68.5 inches
6-28 Started

31370
2800
34170
170. Ohms

265
269
5314

35
30
65

TAE

Lamp 1337
6" Bamboo Drawn in sliding mould

6-18	Started
	58.5 inches on bar or 71 candles
6-45	Flue disappeared
7-20	62 Minutes

TAE

Standard cells
made July 30 1880

Lamp No. 1234
Best clamped V = 108
Best clamped very light

16 candles
Red spot

TAE

78

1,8976
1,8976
1,6464
8,0048
3,4464 2500
4,5185
1,0721

11.8 per H.P.

79

Lamp No. X329 July 30
New model Bamboo

Oberlin Lamp No 1322
Vacuum Lamp
Red Bamboo 16 candles
238 63.5
235 66

79

1883 0
950
19780
98.9

TAE

1.9206
1.9206
1.6464
8.9018
3.4894 3080
1.5185
1.0291 1077

Lamp 1331
Bees mould Bamboo

250 = D
83.3

18830
1100
19930
99.6

1.9605
1.9605
1.6486
7,9814
3.5488 3540

Lamp No. 1332

went at clamp

Lamp No. 1336

vacuum gone

Lamp No 1333
18,830
2.050
20 880
10 4.4

PAE

1276
91.3

Lamp No 132

Regular

6.69 0.8254
2 DG 1.3345
144 Volts 2.1599
2.1599
1.6464
7.6183
3.5845
3800 4.5185
.9340

8.5 per H.P.

No. July 30, 1880.

6" carbon

333 16 candles
336
669

376.60
105.00
481.60
240.8 Ohms

49.25
50.75
100.00

Lamp in Kerosene vapor

2 candles

185 = Δ

=

~~4850~~

4500

22.5 Ohms Wrong

TAP

1.8573
1.8573
1.6464
8.7570
4.1180

13000

About 16 candles

215
72.5

3500
17.5

Wrong

Tick

2.4757
8.0875
0.0234
1.2.1.
1.8976
1.8976
1.6464
8.[illegible]42
3.4758 2999 ft. lbs.

The temp in the calorimeter increased [illegible] until [illegible]

Temp H_2O 69°37
air 84°
147
[illegible]

4-30
1-45

Started

300 299
298 297
825 [illegible] 82.75

12500
5900
18400
92.4

100
69.3
30.7

2-2 Stopped. 100° F

Total Wt Vessel

1102 Grms.
247.5
954.5
20

974.5 1.9888
0.3432
2.8893
8.7696
1.9909
1.4871
3000 ft lbs. 2.7780

Paper in Provence

6 Quires
570
2 Qrs Pens
148 =

TAG

1.9460
1.9460
1.6465
5.0438

3.5822 3820
4.5185
.9363

8.6 per Horse power

6" carbon in Gasoline vapor

16 candles Quadrida

12550 19 candles 45°
5600
18150
90.4

1265
88.3

TAE

1.8976
1.8976
1.6464
8.0031
3.4447 2780.

Sample No. 132

437 = D
79

18830
·1040
19870
99.35

TAF

1.98-0.5
1.980 5
1.6464
1.9848
3.3922
4.5185
.9263

3910

8.44 per H.P.

Lamp No. 1343 Aug 2. 80

6" Bamboo heater in gasoline

Resistance cold

18830
7300
26130
130.15 Ohms

287
28 7

64.5
65
95.6

18830
1900
20730
103.6 Ohms

1.8633
1.8633
1.6464
8.0245

1.0727
1.8777
1.6464
7.1026
3.4182

3.3975
2580
2620

	Volts	Ohms	H. Vs
Page 78	79	98.9	2800
100	~~79~~	99.3	2780
104	73	94.5	2500
	74.6	99.1	2620

Lamp No. 1322 August 2

6" Bamboo in gasoline

16 candles

219
218

73

18830
100
18915
94.5

224
74.6

118830
94.15

TAE

Aug 2

Lamp No 1343

6" Bamton in gasoline

Very bad short below which has increased since the lamp was tried a short time since. blue on clamps

292

18830
1850
20780
1039

Rents due Aug 2
paper in between valves

16 candles

139 = Δ

5390
25.9 Ohms

TAE

11-3 68.11.5-1 Starting

350

12 5.80
6 3 40
18.9 20

94.6 Ohms

11-7 Wind TXE

Calor of Galva

Aug 2, 1920

Temp air 87°37

2-20 71° F Temp water

268 = 0

18830
800
19630
98.14

Temp. heat

2.17
118.5

2.11425
7.92651
0.0334
1.3010 .92608
1.7033
1.6981
1.6762
8.5918
3.6398
3.6263
0.0135

50.5
49.6

4760

1.03%

Calor Heater

Lamp No 1342

Paper brought up in heater

2-36 Temp H_2O 74°77

87.3
74.7
126
87.3
99°97

(5-120
25.6

150
148

65
65

99.7
74.7
25 5

Incubator
277
277
Stopped

Boilermix
120
117
99°7

4h

Calor of Galvan

24 vessel &c

1119
247.5
871.5
20

0.891.5

T.9501
0.3432
2.8893
9.0458
1.2779
3.6263

comp 9

4230

2.4472
9.2608
1.7080
1.7080
1.6464
8.5935

4500 3.6559
3.6368
.0191

1045 - 9

1152
245
907
20
927

1023
72.2
301

1.9671
0.3432
2.8893
8.9586
1.4786
3.6368

3-4 72°2 F Started

87.4
72.2
153
57.5
1028

TDF
20 cells
117

250
280

5100
285

3-15 102°3 F Stopped

1152 Grammes

278.5

2.4448
9.2608
1.7056
1.7056
1.6486
8.5910
3.6486
.6373
.0113

4450

1124
245
879
20
899

7.9538
0.3432
2.8873
9.5
9.0223
26.8
1.4267
3.6373

Gives 1,025 % greater than Calor

Lamp outside coated with tar

2.54

74° F

78) 4600000 (590
390
1480.
1404
760
702
580
546
34

4,600,000

TAE

280
277
5130
25.6 Ohms.

2 hr. 53-36' 100°.8 F

100°F
74
26°

2·8092
7·3901
1·3345
2·0338
2·0338
1·6454
7·8172
3·5312
4·6518
·9873

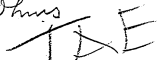
3400

9.7

6" Bamboo
No. 1346

16 candles

25080
6100
31180
155.9 Ohms



825 322 63
820 322.5 65.75
5445 128.75

2.8000
7.9914
1.3845
2.1259
2.1259
1.6464
7.8573
3.7555
4.1855
.7530

9.3259
133

5700

$.18 per ton R.

3.7555
1.1855
1.9042

80 ft. lbs per mile

.7630
1.1855
2.6143

4.12

6" Bamboo Aug. 2

No. 1346

8-15 68'.5 on bar

318
314
317
631

53
49
102

25080
2710
27-90
1389

TAS

8-22 Stabbed

8-24 Stabbed

~~9-17 Edison~~
~~9-25 Batch~~
9-30 Hughes
~~9-10 Upton~~
~~9-16 Robin~~
~~9-16 Martin~~ Pool closed

~~$5.00~~ $2.00
Batch bets ~~$1.00~~ that Hughes does not run with Hughes bets that Batch does ~~not~~ run
~~B~~ bets $.50 that
Batch bets $.50 that
does not [illegible] 9-?
taken by Hughes

Edison bets $2.00
that Lamb does not
last until 9-45 P.M.
with Hughes

~~Upton 9-?~~
~~Batch 9-?~~
~~Hughes 10-15~~
~~Edison 10~~
Martin 10-30
Hughes 10-25
Batch bets $1.00 that
Hughes does not run
Hughes bets $2.50 that
it last until 11:30
Batchelor

Pool closed
Pool closed
Pool closed

Hughes left $3.00 to $2.00 that the Camps lasts beyond 10-30

Hughes 12-15

Batch 10-45

11-30

11-45

Hughes 12—

Batch 12-15

Hughes 12-30

Batch 12-45

Hughes 1-15 $3.50

Batch ~~5.00~~ to that $1.00 to 5.00 that the Camps won't last until 3 A.M. tomorrow morning

Open to 12

Hughes ~~to that~~ $ between that the Camps lasts until 2 A.M. Tuesday Morning

Hughes bets $1.00 that Butch does not wear the hat and that he wins

Hughes bets $10 hat to the Canadian Club ~~Cash~~ Cash in Total 2

Upton bets ~~$10~~ to $1.00 that it will not Cash in total 3. A. M

Taken Hughes

~~3h 40'~~

11h 40'-30 Went

Lasted

3h 28'

208 minutes

9.3259
2.4393
1.7652
6.3010
2.0662
3.1062
1.6664
7.7922
3.5670
4.5185
9515

116 Volts

3690

8.9 k.H.P.

Lamp No 1345
Aug 2 1880

6" Bamboo

16 candles

1275

25080
7200
32280
161.4 Ohms

6x.5

330

108

2.4290
1.8010
9.3259
2.0558
2.0558
1.6[illegible]
7.8111
3.5693

3710

16 candles

3400 ft. lbs
3690
[illegible]

4.5185
3.5693
9492

8.9 H.P

Lamp No 1348
6" Bamboo

16 candles

263

25080
5810
30890
1544.45

168

2.5250
0.3010
9.2219
2.1519
2.1519
1.6515
7.8636
3.5738

141 Volts

6510

4.5185
3.8136
.7047

5 for H.P.

Aug 2. 188

12-10

68"5

335 = 8

25000
2310
27390
136.9

Tol

$150

Batch Kit that it will not last until 1-40 A.M. Taken Hughes. Seine with Upton Batch Hughes Dopson above Lot.

1st Point of Land 13 x 8

Upton 1

~~Pratt 1-15~~

Hughes 1-20

~~Pratt 1-25~~

2nd Point.

Pratt

Upton

130 Akron

Hughes

Hughes 2nd IN.

1-17 West

1-37

17 Minutes

~~3,3,~~

1100

30

~~30~~

1200

12

3.14

~~14~~ 3800

2.806
8.0292
1.3139
2.1493 141 Volts

Machine on pump

315 = D
325
640

49
44.5
93.5

141 Volts on line

318
318
320

290 × 47 = 13360 volts

2,1462 4
8.3279
1,334 5
2:1248
2.1248
1.6464
7.8359
3.7319

5400

133 : 147 :: 145.9

2.1492
2.1471
7.8761
2.1894

15-480 ohm
145.9
8.5

6" Bamboo
No 1345
see page 132

66.5 × 13.5 = 48.5 candles

1,8228
1.1203
.6925
1,3850
.3010
1.6860

6" Bamboo
46 candles

290 = D
292
288
288
250 80
41 00
29180
145.9

47
47

1/2 hour

Aug 3rd

68 11 1.8325
12" 1.0792
7533.
2
1.8066
1.3010
1.8066

64 candles Put on pumps line at 3-55 P. M. clark up stairs

Ran 2 hours 15 minutes Engine ran too fast and broke it

2.6758
8.0254
1.3345
2.0357 — 93599
2.0357 — 108
1.6464
7.8487
3.5668 — 3600

Lamp No 1346 aug 3 1885
6" Bamboo FBH.

Good carbon
16 candles

237 × 23 = 47[illegible]

463 × 48 = 943

25080
3220
28300
1415 Ohms

271 | 320 | | 134.5

2.1286
2.5051
7.5670
2.2007

15-8.7
134.5
24.2

16

5.43

2.7348
9.3599
2.0947
2.0947
1.6464
7.8714
5.7072

5 Rod

Lamp No. 1246
6" Bamboo

64" 48 candles

271
272
543

25080
1820
26900
134.5

Went 20 minutes on
Photo room then up stairs

26848
9.35-99
2.0447
2.0447
1.6464
7.8242
3.5600
4.5185
.9585

3630

9.1 per H.P.

Lamp No 1349 Aug 3.1st Aug 3.80

6" Bamber

16 candles
Good lamp

242
242
484
25080
3,00
28180
140.9

283 : 320 :: 131.4 :

2.1185
2.50571
7.15482
2.1718

148.5
131.4
17.1

2.7520
9.3599
2.1119
2.1119
1.6469
7.5815
3.7517

129.
129

5640

Lamp No 1349

48 candles

283
2.584
5 6 5

5 Pints 25080
1200.
26280
131.4

148

2.7292
8.0245
1.8345
2.0882 122
2.0882
1.6464
7.7253
3.5481 3530

Lamp No 1351
6" Bambo.
Selector.

16 bundles

268
268
536

46
48.5
945

31370
6200
37570
187.8 Ohms

48 candles

31.370
3.000
34370
17185

T69

No 1347

6" Bamboo Bud vase

Gift & candles

sent in about five minutes

TAE

	132	161.4	3690				
	136	154.4	3710		136.9	6510	Lasted 97 minutes

		16 Candles		48 Candles		71 Candles		
	Page	Thms	Ft lbs	Thms	Ft lbs	Thms	Ft lbs	
	69	188				170		Lasted 62 minutes
Good	87	240.8	3890					
Good	123	155.9	3400			138.9	5200	Lasted 208 minutes
	153	140.9	3630	131.4	5640			
	157	187.8	3530	1768				about 6 minutes
1752	165	151.4	3660		5740			
	175	152.6	3500		4720			Lasted 510 minutes
	184	137.2	3560	126.7	5400			Lasted 12 minutes
	188	151.5	3640	139.7	5550			197 minutes
Poor	192	181	3620	161.3	6000			four minutes
	204	178.1	3610	161.6	5150			four minutes
	208	156.8?	4100?					Poor ... I want coal
		166.9	3370	158.7	4990			4720 minutes
	220	216.6	3220	195.0	5180			Touched the clears
For carbon	224	283.1	3440					
			45960	over				

6 11 Bamboo Filament

163

2.6902
8-0241
1.3345-
2.0488 — 9.3586 — 114 Volts
2.0488
1.6464
7.8199
3.5639 — 3660

From page 163

	16 candles		48 candles		
1371 P. 238	165.9	3790	151.9	5430	
1373 P. 232	166.3	3760	149.9	5380	Good Lamps 3660 candles
1373 P. 236	158.6	3650			
1374 P. 234	164.1	3670	156.1	5040	
1376 P. 244	238	3600			

Lamp No 1352 — 165

Selected 6" Bambos

16 candles

246 — 244 — 490

46.5 — 48.7 — 94.6

250.60 — 5200 — 30280 — 151.4 Ohms

TAE

Average Rt. 16 candles.

3580 @ 16 candles

2.5185
4.3586
1.8771
1.8771
1.6464
7.7699
3.1705

75 Volts

1480

Lamp No 1852 aug 31 1920 167

6" Selected Bombs

0.012 X 0.012

1 Candle

165 R
165 L
330

TAC

8900
25680
33980

1699

2.5587
9.3586
1.9173 82.6 Volts
1.9173
1.6464
.7802
3.2612 1820

4.5185
3.2612
1.2573 18.1 Jan H.P.

No 1852 Aug 3rd 80
6" Adiatic Bands 6P 24

2 Cascades

182 L
180 R
362

45080
8170
33180
165.9

TAE

2.6021
9.3586
1.9607 91.3
1.9607
1.6464
7.7908
3.3586 2280

4 Carolus

200 R
200 L
400

TAE

25050
7800
32380
1619

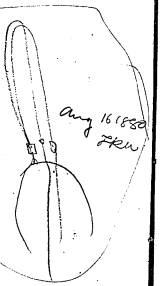
2.6435
9.3586
2.0021
2.0021
1.6464
7.1806
3.4671

100 Volts

2865

H2

81 . 110 :: 6
8
81) 660 (8
648
120



No 1852 Aug 3 80

8 candles

220 10
220 2
440

TAE

25080
6270
31350
1566.5

2.6821
9.3586
2.0407 110
2.0407
1.6464
7.8164
3.5742 3500

It takes a ~~ft. lbs~~ to give 2 candles
" " " " " 12 candles
with same surface — and current
Surface = ~~n~~ gives 2 candles
Surface of another lamp = n
to give 12 candles what ft. lbs required

Pa 1352 - Aug 30/1880

about
9-8.12 16 candles

2.40 2 45.5
24.2 12 49
2.40 . 2 94.5
481

TAE

25 = 250
6 = 360
3 4 4 3 0
15 2 6

2.7308
9.3586
20894
2.0894
1.6464
7.8404
3.6656 4630

1 3 5-2 Lic 3.90

3.2 circuits
Probably wrong

269 C
2
538

TAE

3800
25.080
28860
144.4

2·7482
9·3586
2.1068
2.1068
1.6464
7·8511
3·7111 5140

2.7364
9.3586
2.0950
2.0950
1.6464
7.8631
3·6985 5000

67 1.8261
13 1.1139
.7122
2
1.4244
.3010
1.7254

53 candles

1852 May 3 80

48 Canes

280
560

9.28 3150
2800
2818 0
140.9

TAF

9-30 67" on bar
275 274
70
545
25080
2400
27480
1837.4

50
44.5
94.5

2.7259
8.0223
1.3345
2.5427
2.1052 27
1.6464
7.8621
3.6739
86.5 2.17270
.321 2.15065
5.52 2.17497
7.44 2.87716
1.0648
5.5324
116,100,000,000
340,800

9.3568
121
4720 ft. lbs.

No 1855-2
aug 4 8 A
Gr. Bl. Mk
66".5 on bar

262
270
532

47.5
47.5
95.0

25080
2480
27460
137.4

TAE

The bad places in the carbon rose in - creased since last last evening

25080
2350
27430
137.15

265
268
533

$\frac{5}{2}$
$\frac{}{7}$

At 6 P.M. 8 hours 15 minutes
Went 15 minutes more

8 hours 30 minutes
480
516

Pump line
Aug 4

315
318
633

533: 633:: 137.15:

2.8014
2.1372
7.2733
2.2119

TAE

163
137.15
2585

12 feet 24.5 hours

Lamp 1352 feet on
pump line at 6 and 0
with 1 hour 15 minutes
run

9.3568
2.6648
2.0214 105
2.0214
1.6097
7.8627
3.5819 3860

Lamp No 1355
6" Selected Bamboo

Very good carbon
16 candles

TAE

25.080
2370
27450
137.25

234
228
462

5321;633 :: 126.7

2.70028
2.8014
7.2749
21791

151
126.7
243

2.72251
9.3568
2.0819
2.0819
1.6464
7.8972
3.7074

5400

48 candles

TAF

264
262
268
251

25080
270
25350
126.7

Went in 12 minute in the glass

2.6902
9.3668
2.0470
2.0470
1.6464
7.8210
3.5614

3640

No 1354

6" Spiralled bamboo 6"012 X 6"012
Very good carbon
916 candles

248
242
490

TAE

25080
5-2-20
303 cwt.
1515

580 : 633 :: 139.9 :

2.8014
2.1458
7.2366
2.1839

1572.5
139.9
1 2.6

580 2.7634
9.3568
7.6467
7.8542
3.7410 5550

48 candles

TAE

287
293
580
250 80.
290 0
299 80 139.9

46. (20 cdls.
99.
95

1.38
2.2
7.55
3 hr 17 minutes

197 minutes

5.35

2.7284
9.3568
2.0852
2.0852
1.6464
7.7416
3.5584 3620

No. 1353

6" Selected bamboo

Irregular at low red dark Places in middle of side

16 candles

TAE

265
270
535

.31370
4900
36270
181.35

2,8129
9.3568
2.1697
2.1694
1.6464
7.7925
3.7783

6000

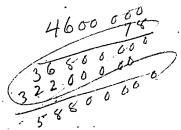
48 candle
Blue at clamp.

3.20
3.30
.50

THE

31370
900
32270
161-35

Went in for ammeter.



78. / 4600 000 / 58
390
700
574

78. 460

88 / 4600 000 / 4
2

1.800000 / 4660 000
18
28 69.

Pumps Mine

300
307

48.5
45.5
94.0

Put in one plug in magnet line

313
317
630
31.6
31.4

THF

2.4997
8.0269
1.3345-
1.8611
1.8811
1.6464
.1700
3.3386 .2180
0.8481
.4935 311

9.3614
72.6 Volts

Lamp No. 1339

7 candles
156 L
160 R 94
316

18830
2600
21430 TAE
107

Lamp No. 1331

6 3/4 candles

156
157
.
.

18830
1470
20300

TAE

202

203

no. 1456

direct on pump line

~~Goodlett~~

69
11

1457
65.75

page 208

2.10807
2.10807
7.16424
7.7494
3.55572

3610

Lamp No. 1366

6" Bamboo from gas furnace

16 candles

262
262
524

47.5
48.
95.5

31370
4250
35620
178.1

THE

603 ; 633 ; ; 161.6 ;

2.2086
2.8014
7.2197
2.2297

169.7
161.6
8.1 4ft.

603 2.7803
9.3568
2.1371
2.1371
1.6464
7.7717
3.7123 5150

Lamp No 1366
6" Bamboo

8-30 48 candles.

303
303
603.

31370
950
32320
161.6 Rounded

Lasted four minutes AE

9.3614
2.7193
2.0807
2.0807
1.1.6464
7.80647
3.61285
4.15185
9060

4100

8.05 for H.R

No. 1367

6" Bamboo

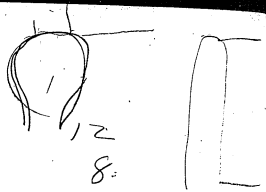
16 candles

262
262
524

95.5

31370
156.8 Thins

Probably wrong TAE



12

8.

10.5 candles for 250 H.P.

16

1500

2500

4000

8

32000

1 12

16

8.5

10 1/3

3030

-1515

4545

9.5185

.6571

8614

7.3 for H.P.

16

8

128

4.5185

2.1072

2.4113

257 ft. lbs per candle

2750 3.4393

12 1.0792

2.3601

229

2625 3.4509

10 1.1129

2.3380

AF

2625 3.4191

10.5 1.0212

2.3979

250

29 2950 3.4968

1475 9.5 0.9777

2950 47 5191

2

90 1.9542
1.6 0.2041
56 hours 1.7501

1 ct

11
16. 1.2041
8. 0.9031
7.5 0.8751

2000
1000

1 ct

2.9823
1.0414
2.0591

.0114 Gallon

1/90 gallon per hour

220 1.3424
2.0591
1.4015
.252 .2041
1.6056

.4 1/4 ct per hour
for 10 candles.

Kerosene oil lamps

22. fluid oz of
kerosene in lamps

Started 10-3 by
my watch

10-10 8 candles TPG
1-37 11 candles
5-25 9 candles
5-40 — — Put out and
11 oz left
7.5 hours

4-7

2.6954
9.3568
2.0522
2.0522
1.6464
7.7776
3.5284

3370

Lamp No 1367 6" Bamboo

a L slight spot on one side but a very good carbon — Bent over nearly touching the glass

16 candles

252
245
497

52
47.5
94.5

51
43.5
95

25080
8360
16720

Hung

Lamp.

Sold

582:630 :: 158.7 :

2.1972
2.1793
7.2351
2.2336

1771.2
158.7
125 6'1"

2.7649
9.3568
2.1217
2.1217
1.6464
7.7995
3.6893 4890

1867

48 candles

295
287
582

25370
6670
31750
158.7

On jump line
7 hours
60
420 minutes

Lamp No 1368
6" Bamboo

Very bad photo W.J.

2.74.9
9..3568
2.0987
2.0987
1.6464
7.6643
3.5081 3220

Lamp No 1369
6" Bamboo

16 candles

280
272
552

37660
5670
43330
2166

GE

2.8228
9.3568
2.1796
2.1796
1.6464
7.7087
3.7143 5180

1369

4 & candles

335
330
665

37660
1470
39130
1956

Touched the glass

2·7723
9·3568
2·1291
2·1291
1·6464
7·6324
3·5370

3440.

Lamp No. 1372

Wavy, tight and dark
16 candles

292
300
592

37660
5970
46630
23315

2.7959
8.0246
1.3345
2.1550

9.3591

143 Volts

No 1372 22 candles
9-10 P.M. Put on Pump line

Deflection on pump line

310R
315L
625

Went in about two minutes with arc

2.7185
9.3891
2.0776
2.0776
1.6464
7.7772
3.5788 3790

The lamps placed so as give 48 candles. Melted of the German silver wire 4 ft. in with it. Clamps blanks and wire blanks. Put on sixteen candles three at lamps. D = 285 after short time carbon gone about at clamps. Cleaning them and depositing carbon on the tip of the clamps reduces D from the blanks.

Nov. 13.71

16 candles

259
264
523
25080
8100
33180
1659

597 : 630 :: 151.9

2.1815
2.7993
7.2240
22648

1600
151.9
8.1

2.7760
9.3591
2.1851
2.1251
1.6464
7.8185
3.7351

5430

Ki 1371

48 sums
see page 228

294
303
597

25080
5300
30380

151.9

2.7160
9.8591
2.0751
2.0751
1.6454
7792
13.5758

3760 ft. lbs.

No 1373

8" Bamboo

Very perfect carbon a slight bad effect near camp Straight

16 candles

JAE

25.5
265
520

31370
1900
33270
16635

2.7709
9.35-91
2.1360
2.1300
1.6464
7.8242
3 7306 5·380

590 : 630 :: 149.9 :

2.1758
2.7993
7.2291
2.2042

160.0
149.9
10.1 5l

Over p. 236

No. 1373
6" Bamboo

4 ℔ candles
by mistake very high

300
290
590

25080
4900
29980
149.9

6 hours
360 minutes

2.6990
9.35-91
2.0581
2.0581
1.6464
7.7997
3.5623 3650 ft lbs.

From p. 234

Blue all through lamps good lamps when just over pump time

Lamp No. 1373
6" Bunsen

16 candles again has been very high since last brought up

25-5
245
500

25080
6650
31730
158.6 Ohms

2.7076
9.3591
2.0667
2.0667
1.6464
7.7850
3.5648 3670

Lamp No 1374 (Aug 5-
6" Bamboo 239

Good straight carbon

16 candles

258
252
510

25080
7750
32830
16415

583.630 :: 156.1 :

2.1934
2.7993
7.3343
2.2270

168.8
156.1
12.7 6".3"

2.7657
9.3591
2.1248
2.1248
1,6464
7.8067
3.7027 5040.

No 1374
6" Bamboo

46 minutes

287
296
583

25080
6150
31230
1561

Put on Pump line
8 minutes
Very bad spot in lamp

Lamp No 1376
6" Bamboo
Good straight carbon
16 candles over page 245

2.7839
9.3591
2.1430
2.1430
1.6464
7.6229
3.5555 3600 ft. lbs

Lamp 1376
6" Bamboo
16
~~15~~ candles see p. 143

310
298
608

3768 ~
(illegible)
(illegible)
2378 (illegible)
Burning four hours at

2,8035
9.3591
2.1626 145.5
~~2.1626~~

Pump line; Aug. 6, 1880. 247

Say 630

318.
318
636

45
49.5
94.5

Lamp 1376 across the wires
27 candles

313
317 Oscillates slowly upwards
down

318
309 With 3 machine current
627

37660
7300
44960

Lamp No. 1375
6" Bamboo

Bad lamp, very high resistance blue at lamps

Hung direct across the line.

JAC

Lamp No. 1378
6" Bamboo

Went in glass on bringing up.

JAC

Pump line
Aug. 6, 1880

3 P.M. 20 cells

49
45.5
94.5 = 0

300
296

Changed

311
308
313

Lamp No. 1379 Aug 6

6" Bamboo Taken from gas

Carbon wavy and uneven

48 candles

TAE

$\frac{E^2}{R} \cdot 44.3 = ft.\ lbs$

$E^2 = \frac{ft.\ lbs \times R}{44.3}$

3.6154
2.1761
8.3536
4.1451
2.0725

118 Volts

Aug 11 Wednesday eve

Mr. Edison wishes to start 200 lamps next Friday

Conductors.

The line leading along the turnpike to be wound with three layers of cloth tarred, then wound with marlain.

See that plenty of cloth and marlain are ordered so that men enough are put on the job.

seven days labor

cloth,
Marlain
tar
labor
rubber tape
liners cut off

Machines

3 Westinghouse machines

Present Lamps require 115 Volts

Machines must run 1100 revs. The exciter must run from main shaft.

3 machines probably enough since the Lamps are so much higher resistance ~~than~~ ARC

Must run 1100 revs.

The three machine in position now will do the business of Changed to multiple run which can be done in a minute.

Meters

Rig meters for
2 for 20 lights Edison Jordan
1 for 30 lights Laboratory

Lamps
Glass must have ...
Blowers
Lamps arrangement for bringing up lamps when on.
Pick out Lamps. Class to lamp post. and number Lamps accordingly.
5 classes according to distance

Meter

The average is 21 H. P. is [illegible]

115/165 Wekers

1 mg. per hour

No mg. per hour

Houses

In Mrs Jordans relay the the wires out of sight.

~~Segerstrom~~
Hemicke
Hammer
Forrest

Hills

TAE

Davis Hotel Mrs. Committee's Hussie Edisons

Wrap wire used in rubber tape solder joints. use Rand safety clutches.

67.75 1.8309
12.25 1.0881
7.28

56 candles

Lamp No. 1399 L

20 cells 46
40
86

48 candles

290 290 290
295 295

31370
2500
33870
16935

2·7731
8·0655
1.3345
2·1731 149 Volts

Pump line

300 - 310
305
288
593

300
280

304 - Tar
245

Lamp No 1399 c

48 candles

283
286

TAE

31370
6500
37870
189.35

Lamp No. 1416, High vacuum
6" Bamboo 0".012 X 0".012 first lamps
from new mould to carbonize
as to please in the lamps sideways

Straight carbon
Slightly wavy and irregular

16 candles

213
208

31370
2900
34270
17135 Ohms

Lamp No 1416

48 candles

247
238

TAE

31370
800

Lamp No. 1419
bad shot

48 candles

4.40
20 cells
40 both wires
267
270 on lamp

3,370

TAE

Lasted about 1 minute

Lamp No. 1420

6" Bamboo

48 candles

11-20 253
251

40.5
41. 20 cells

25.080
5700

11-30 Stopped

Lamp No. 1421

6" Bamboo

48 candles

223
224

TAE

25080
2900
27980

278

7.5

10g 1/2

3/2 3

.7559

8.2441
2.7782
1.3345
2.3568 227 Volts

32 oz 1 Gallon
4
128 oz 1 Gall
.43
.85 hours
42.5
3
7275

279

220.
235
464

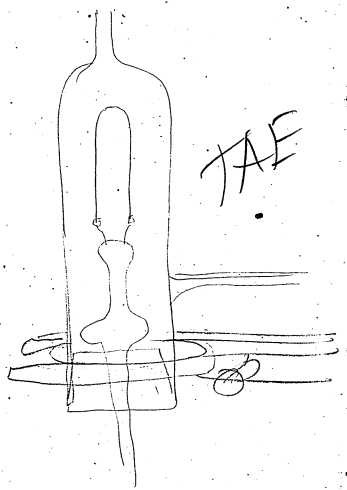
27
30
57

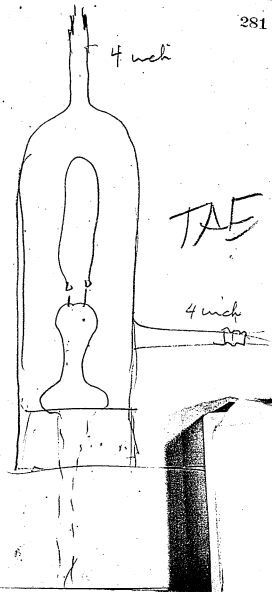
2.66.75
8.2441
1,3345
2.2461 176 Volts

TAE
26
31
57

.4 mills for ten
.5 mills cars leaves

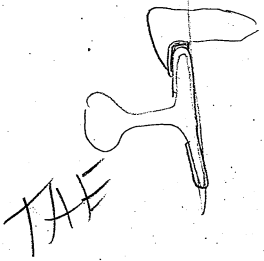
200
4
80


TAE


4 inch
TAE
4 inch

150 2.1761
2.1761
1.6464
4.8 9.3188
5.3174
207,000 4.5185
.7989

6.2 H.P



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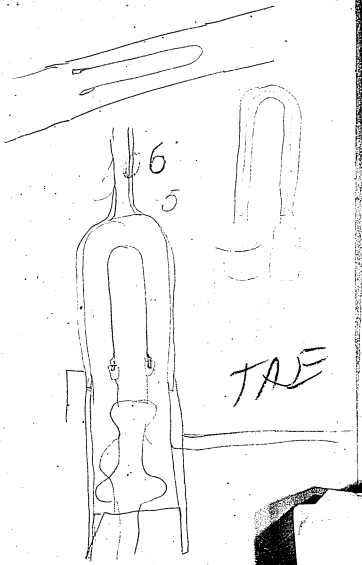
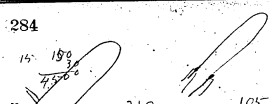


TAE



15 180 3 4500

70 4 280 10 1800

210 210 21.00 420 1141 100 401 1700 00 1764 40 8 1.94 0.4 80

105 105 5-25 105 1207 5 44 483.0 4830 53130 3 1593900

THE

1.940 6.2878 458 0.6812 25 5.6066 4

40 4000

28. 15 60

40 4 6 10 5 00 120 1960 (120 30 4 40 1200 72

1/4 1/4 28. 3 84. 75

28 hp

2,600.000 78

120. 13 24 120 14 20 200 182 000 000 2028 000 000

4 / 1.940, 470 485-100 10.00 3 101 3000

48 / 485-100 121.275

48 / 485-100 (101 48 48 200

48 / 485-1000 (48 5-

THE